**International Research Partnerships… a snapshot**

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**National Research Partnerships… a snapshot**

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**Our Research Strengths** 40-43

**Research Initiatives at UOW**

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IT GIVES ME GREAT PLEASURE TO INTRODUCE THE UNIVERSITY OF WOLLONGONG’S ‘PROFILING OUR RESEARCH PARTNERS’ BOOKLET, WHICH FEATURES SOME OF OUR WORLD-CLASS RESEARCH PROJECTS THAT ARE UNDERTAKEN IN COLLABORATION WITH OUTSTANDING PARTNERS.

Collaborative research is a growing strength of this University and plays a major role in helping us fulfill the University's mission to explore, develop and apply human and technological capacity for the benefit of our region, the nation and the international community. Our researchers work with industry, and other R&D organisations, on projects that really make a difference to our world and to people’s lives.

The University of Wollongong's remarkable research record proves that size is no barrier to success. In fact, it can be an advantage UOW consistently outperforms much larger institutions in winning Australian Research Council (ARC) and other nationally competitive grants.

For research grants announced in 2007, the university ranked 3rd nationally in total ARC grant income (approximately $14.7 million) relative to size.

UOW has capitalised on its size to create a research environment that facilitates multidisciplinary approaches to research, is focused on outcomes to real problems, and is underpinned by our strong partnerships. We have a number of long-standing relationships with steelmakers, telecommunications carriers and pharmaceutical manufacturers. Our researchers also collaborate with other leading universities around the world.

Building on our reputation for research that makes an impact, we continue to strengthen our capacity to commercialise the results of our research through a partnership with the leading Australian university technology company UniQuest. We believe this historic agreement will become a model for collaboration in this important area for the sector.

This profile coincides with UOW being ranked as one of the top 200 universities in the world by The Times Higher Education Supplement - Quacquarelli Symonds World University Rankings 2006/7.

More recently UOW has moved into the Top 500 academic rankings of world universities by the respected Institute of Higher Education at Shanghai Jiao Tong University, reflecting the high quality and significance of our research outcomes.

We have also achieved a five star rating amongst a range of key indicators in the 2008 Good Universities Guide, including the category ‘Research Intensivity’.

This publication profiles a snapshot of outstanding UOW researchers and their association with other partners both within Australia and worldwide. We thank them for their support and look forward to continuing these productive research partnerships.

Professor Gerard Sutton
Vice Chancellor

vice-chancellors introduction
a snapshot of our international research partners
Miners face many dangers in performing their day-to-day duties. Rapid and well-organised rescue operations are crucial to saving their lives in the event of an accident. An emerging partnership between UOW and the Chinese Academy of Sciences (CAS), one of China’s premier research organisations, is working to improve mine rescue operations through the use of broadband wireless technology.

The Wireless Technologies Laboratory, part of UOW’s Telecommunications and Information Technology Research Institute (TITR), first joined forces with the Institute of Computing Technology at CAS in 2003, and then entered a faculty-level Memorandum of Understanding in 2004. Building on the success of initial collaborations, a university-level agreement was developed in 2006.

The focus of the research is the development of wireless protocols to extend the range of broadband wireless technology. This range extension will allow the technology to be used deep inside coal mines to provide reliable support for real-time audio, video and data communications, which will assist in emergency operations in coal mines.

The project, coordinated by Professor Eryk Dutkiewicz and Associate Professor Xiaojing Huang from the UOW, allows access to the extensive facilities, and research student training programs at CAS. UOW is focusing on developing routing algorithms, while the CAS is investigating traffic scheduling algorithms, required to operate in a mining environment.

The partnership is set to continue through joint applications for external grants and a formal program for staff and student exchanges between the two institutions.

ANHUI INSTITUTE OF OPTICS AND FINE MECHANICS

If future strategies and public policies on global environmental issues such as the greenhouse gas emission and ozone depletion are to be well founded, a far better knowledge of the sources, links and transformations of atmospheric trace gases are required.

Considered as a leader in his field, UOW Professor David Griffith, director of the Centre for Atmospheric Chemistry (CAC), has established an international reputation for the measurement of trace gases and organic pollutants in the atmosphere.

CAC is currently working with Professor Wenqing Liu from the Chinese Academy of Sciences in the measurement of atmospheric pollution using Fourier Transform InfraRed (FTIR) techniques. Professor Liu initially sought collaboration with the CAC to learn how to conduct his own measurements of atmospheric pollution in China.

“Air pollution is becoming a bigger threat in China as the population increases and the economy develops. If we want to lobby the government to do something about it, we need data. We need to be able to measure the atmospheric pollution,” states Professor Liu.

Professor Liu believes his association with the UOW will strengthen his research at the Institute of Optics and Fine Mechanic(s) in China and envisages the development of reciprocal training courses between the two institutions in the area of atmospheric pollution.

SHANGHAI JIAO TONG UNIVERSITY

The growing alliance between UOW and Shanghai Jiao Tong University (SJTU), one of China’s oldest universities, is leading to exciting breakthroughs in the development of fuel cell and battery technology. The alliance was formalised by an official agreement between the Institute of Superconducting and Electronic Materials (ISEM) at UOW and the Department of Chemical Engineering at SJTU in 2005. Together these teams are focussing on an applied study of the energy materials used in fuel cells and rechargeable lithium ion batteries. Researchers at SJTU prepare the energy materials and their electrochemical performance in the fuel cells and batteries. The structural characteristics of these energy materials are then measured at UOW’s world-class XPS and TEM facilities.

The success of these cooperative activities encouraged the team at SJTU to expand its links with other researchers at UOW. In 2006, SJTU signed a 5-year Letter of Understanding with UOW’s Intelligent Polymer Research Institute (IPRI), covering areas such as the exchange of research staff and students, sharing facilities and the transfer of knowledge, particularly in the area of direct methanol fuel cells. This electrochemical power source has displayed promising results for portable, high power applications such as mobile phones and automobile propulsion.

The Wireless Technologies Laboratory in UOW’s Faculty of Informatics has also established close collaborative links with several premier institutions in China, including Shanghai Jiao Tong University. Professor Dutkiewicz and Associate Professor Huang are involved in research into novel wireless technologies for 4th generation communications systems. China is one of the leading nations (alongside Japan and Korea) in the development of these systems and our collaboration places UOW in the forefront of these activities. Research collaborations with SJTU have resulted in official university-level agreements which will enable UOW to further develop its current activities, advance its presence in the Asian region and extend the exchange of professional staff and research students between the institutions.
In June 2005, UOW signed a Memorandum of Understanding (MOU) with the Universiti Sains Malaysia (USM) in Penang, one of Malaysia’s oldest and most prestigious universities. The agreement incorporates a range of collaborations, including student exchange and joint research in Education and Arts. This includes work with the Centre for Asia Pacific Social Transformation Studies (CAPTRANS). There is also an ongoing series of projects investigating the issues of global English in university education in Australia and Malaysia. Several CAPTRANS staff including Associate Professor Lyons, Dr Scrase and Associate Professor Kell have had ongoing visits to USM, and senior USM staff have visited UOW over the past three years, for a number of important collaborative events:

- The Australia Malaysia Forum on Higher Education was held at UOW in November 2005, and involved academics from China, New Zealand, Malaysia and Australia. The workshop was instrumental in establishing links with the National Higher Education Research Institute, Malaysia.

- Cambridge Scholars Publishing published a volume of the papers from the 2005 Forum in July 2007, with the title of ‘Higher Education in the Asia Pacific: Challenges for the Future’. This book, which is an international collection of US, Malaysian, New Zealand, Chinese and Australian contributors has been initiated and edited by UOW researchers Associate Professor Kell and Dr Gillian Vogl.

- Associate Professor Kell also acts as a co-director of the Universiti of Sains Malaysia’s, International Literacy Research Unit (ILRU) and is a visiting professor to the School of Humanities at USM.

- In 2007, USM, CAPTRANS and UOW jointly hosted two major international conferences:
  - LITCON 2007: Literacy and Citizenship: Pathways to Sustainable Education
    25-27th July 2007 Georgetown Penang, Malaysia, and
The University of Wollongong won a coveted Microsoft Research Asia grant in 2006 for internet security, with the Telecommunications and Information Technology Research Institute's (TITR) Centre for Information Security (CIS) beating dozens of entrants from a range of universities across the Asia-Pacific.

The Director of TITR (at the time) Professor Safavi-Naini was the first-ever Australian winner of a security-funding research grant with team members Associate Professor Willy Susilo, Associate Professor Yi Mu, Dr Jeffery Horton, Dr Joonsang Baek and Dr Wanqing Li.

The grant funds cutting-edge research into building tougher security for online transactions such as online banking.

The research partnership with Microsoft Research Asia is of strategic importance for the TITR because of their interest in security and our wide range of expertise in the area.

"Online services have gained more and more popularity in our daily life and authentication is a critical part of these services," said Trustworthy Computing team member (Microsoft Research Asia), Dr Bin Zhu.

The project aims to address this important issue by developing a proven secure authentication scheme based on the emerging technology of identity-based cryptography. The research grant is part of Microsoft's ongoing efforts to help encourage a greater level of innovation in Information Technology and to develop a stronger Australian IT industry capable of creating valuable world leading technology.

"As Australia strives to remain competitive with the emerging economies of Asia, the need to innovate has become more important than ever. Through IT research grants and great Australian technology innovators, Australia can hold its own against the most technologically advanced nations in the world," said University Relations Manager for Microsoft Research Asia (based in Sydney), Mr John Warren.
When the authoritative British weekly scientific journal Nature published its final edition for October in 2004, its cover story created a sensation that continues to reverberate around the world.

The article detailed the discovery in 2003 of a one metre tall human skeleton on an Indonesian island called Flores by a team of archaeologists led by UOW’s Professor Mike Morwood and Professor R.P. Soejono from the Indonesian Research Centre for Archaeology.

The excavation team initially thought the fossilised remains, discovered in a large limestone cave, were of a child or a dwarf. However, further analysis revealed that the skeleton was of a woman around 30 years of age, perfectly proportioned for someone her size.

To determine the age of the skeleton, the excavation team turned to world-renowned dating expert Professor Richard ‘Bert’ Roberts from UOW’s GeoQuEST Research Centre. Professor Roberts and his colleagues, Dr Chris Turney and Dr Kira Westaway, used a variety of dating techniques including radiocarbon, luminescence, uranium-series and electron spin resonance to show that the skeleton was around 18,000 years old.

"Homo floresiensis were the height of a three-year-old child, weighed around 25 kg and had a brain smaller than most chimpanzees," explains Professor Morwood. “Even so, they used fire, made sophisticated stone tools, and hunted Stegodon (a primitive type of elephant) and giant rats. We also believe that their ancestors may have reached the island using bamboo rafts. The clear implication is that, despite tiny brains, these little humans were intelligent and almost certainly had language.”

Perhaps most fascinating of all, the research team learned of local stories on Flores that suggested the “little people” may have existed on the island right up to the 16th century, when Dutch traders arrived in the “Spice Islands”.

Even though Professor Roberts, Dr Turney and Dr Westaway have established that the most recent fossil remains in the cave are 13,000 years old, the team has not ruled out the possibility that the hobbit-sized humans could have survived until relatively recently.

The work at Liang Bua is just one of a number of collaborative projects between Australian and Indonesian researchers from the National Centre for Archaeology in Jakarta, the Geological Research and Development Centre (GRDC) in Bandung, Balai Arkeologi Makassar, and local government departments in Flores, Timor, Sulawesi and Java. In addition, the work involves people with specialist expertise from America, Britain and the Netherlands.

The project, as funded by the Australian Research Council with additional support from the UOW, also has an emphasis on younger participants getting training, publication and educational opportunities. For instance, Gert van den Bergh, a paleontologist from Naturalis in the Netherlands is about to take up a 3-year appointment at the UOW, while Suyono from the GRDC begins his MSc program in November 2007 in which he will study fossil pigs from Sulawesi.

This research team now hopes to explore other sites on Flores, other Indonesian islands, the Philippines, Malaysia and East Timor to better understand human evolution.

“The dogma so far has been that everything happened in Africa. And why people have been able to get away with it is because we know so very little about what happened in Asia. This is a really exciting context in which to do research when so little is known and you can make discoveries of this magnitude,” states Professor Morwood.
A new licence agreement between the Institute of Superconducting and Electronic Materials (ISEM) and US-based company, HyperTech Research Inc, is set to revolutionise the transmission and storage of power, leading to increased energy savings and other environmental benefits.

The agreement is one of the largest licensing deals ever entered into by UOW. It will allow HyperTech to use patented technology developed by ISEM in the manufacture of superconducting wires.

There is great potential for this emerging superconductor to be used for various practical applications such as in the wires in metal coils for magnetic resonance imaging (MRI) machines, fault current limiters, power cables, cryogenic motors, energy storage devices, generators, magnetic separators and transformers.

The improved superconducting performance, reduced cost and ease of production compared to existing superconducting materials, will allow HyperTech to consolidate its competitive advantage. And it is all due to the collaboration between UOW, Ohio State University and CMS Alphatech International as part of UOW's world-leading superconductor consortium.

This technology involves the use of magnesium diboride doped with silicon carbon. The silicon carbon doped material has achieved a world record high critical current density and upper critical field in superconducting magnesium diboride wires.
Since 2003, researchers from the School of Civil, Mining and Environmental Engineering at UOW in collaboration with the Mason Environmental Engineering Laboratory at Yale University have been conducting an extensive research program investigating the fate and transport of trace contaminants during nanofiltration (NF) and reverse osmosis (RO) filtration processes.

It is well documented that numerous trace organic contaminants are present at trace levels in secondary treated effluent and are of significant concern to public health, particularly when considering indirect potable water recycling. Filtration processes (NF and RO) play an important role in the treatment of reclaimed municipal wastewater.

The project coordinated by Professor Menachem Elimelech from Yale University and Dr Long Nghiem from the UOW has significantly enhanced our knowledge base regarding the reliability of such processes to remove trace contaminants from reclaimed water. To date, the collaborating research teams have published six international journal papers and have presented several keynote papers and conference proceedings. The research has resulted in a better understanding of the removal process of such contaminants by membrane filtration. This will allow water utilities and practitioners to optimise the NF/RO system configuration and operation regimes to achieve better economic savings and environmental protection as well as to identify the likely avenue of risks associated with water recycling.
Flow cytometry continues to expand as a tool for medical and biological research, particularly in the areas of immunology, cell biology, oncology and hematology. The amount, size and complexity of data produced by modern day flow cytometry experiments is on the increase. However, the involvement of methodological statisticians is scant. An ISI Web of Knowledge search conducted on 27th June, 2007, showed 50,558 papers containing the word ‘cytometry’ in their title or key words. Only 12 of these were in journals categorised as ‘Statistics & Probability’.

Professor Matt Wand, a Research Professor of Statistics and member of the Centre for Statistical and Survey Methodology within the School of Mathematics and Applied Statistics (UOW), has been one of the few prominent methodological statisticians involved with flow cytometric data analysis since 2000.

Whilst a member of the Department of Biostatistics, Harvard University, through 2002 Professor Wand was involved in joint research on statistical methods for flow cytometry with members of the Decision Systems Group at Harvard Medical School.

During 2005-2007, while a member of the mathematical sciences schools at both University of New South Wales and UOW, Professor Wand was a chief investigator on the Australian Research Council Discovery Project titled ‘Statistical Methods for Flow Cytometric Data’ involving statistical research with the Fred Hutchison Cancer Research Center.

In November 2006 Professor Wand co-organised, with Professor Robert Gentleman (Fred Hutchison Cancer Research Center), a two-day symposium on statistical and software issues for flow cytometric data analysis at the Cancer Research Center in Seattle, USA. About sixty participants from industry and academia attended the symposium. Professor Wand and the Fred Hutchinson Cancer Research Center continue to explore future partnership opportunities.
CALIFORNIA WALNUT COMMISSION

There is a long standing history of partnerships with industry in food and nutrition at the University of Wollongong. One such example is work conducted with the California Walnut Commission. In recognition of her clinical research on diet and type 2 diabetes, Professor Tapsell (Director of the National Centre of Excellence for Functional Foods) was invited to present to the Scientific Advisory Council and identify the potential contribution of walnuts in this context. She did this by integrating knowledge on the nutritional profile of walnuts with the dietary guidelines for diabetes management. Six years later, Professor Tapsell, Dr. Marijka Batterham (from UOW’s Smart Foods Centre) and the clinical team which includes numerous students have conducted six month and twelve month intervention trials and will also conduct short term studies using UOW’s whole room calorimeter to expose the health benefits in walnuts in the overall diet.

This type of research is important in providing the underpinning science to communicate the relative health benefits of different foods. The strength of the work conducted at UOW lies in the dietary modelling that enables the unique contribution of the test food to be exposed.

The first trial found that the dietary model with walnuts helped to modify the type of fat in the overall diet and healthy changes in blood cholesterol levels became evident. This was published in Diabetes Care and lead to an invited review in Future Cardiology and an appearance in Medscape, an online medical education service. The research provided practitioners with both the evidence of effects and ways in which it could be translated to practice. Longer term studies and experiments with the whole room calorimeter at UOW will help to expose issues related to energy balance and long term weight control, two significant areas in diabetes management.

UOW’S WHOLE ROOM CALORIMETER (WRC)


The WRC is a room in the university that contains two airtight ventilated and air-conditioned chambers (set up as bedsitters) that measure energy expenditure and a persons ability to burn different types of fuels such as carbohydrates, fats and proteins.

WHAT DO PEOPLE DO IN THE WRC?

Each chamber resembles a mini hotel room and is equipped with a pull out bed, telephone, television, DVD and video player, computer with internet access, sink and toilet. It also contains airlocks to pass food and drink out of through. Participants are supervised for their entire WRC stay which, depending on the study they are involved with can be anywhere from 2 to 24 hours at a time.

ONGOING RESEARCH WITH THE WRC

Currently UOW’s Smart Foods Centre is running various studies and research programs, that use the WRC:

• HELP (Weight Loss Research) – healthy overweight subjects eligible;
• NCEFF2 (High Protein Diets Research) – normal to overweight healthy subjects eligible; and
• MI (Metabolic Rate Research) – overweight to obese healthy subjects eligible.

Australia and Canada have been engaged in strategies to address the growing shortages in the medical workforce—particularly in rural and remote communities. In both countries, federal and state governments, universities and communities have increased support for medical education through the establishment of new medical schools (eg UOW) and the expansion of existing ones (eg UBC in Canada).

UBC initiated a comprehensive evaluation program to identify indicators and subsequently assess the impact of their medical education initiatives and have extended the program to other medical schools including the recently established Graduate School of Medicine at UOW.

The invitation for UOW to collaborate with UBC in this research area was offered in 2005 Dr Lori Lockyer (UOW) and Dr Chris Lovato and Professor Joanna Bates (UBC), while the Medical School at UOW was still at a preliminary stage.

The project developed a collaborative evaluation program for UOW and established monitoring and evaluation protocols. It has formalised the partnership between the two institutions with UOW representatives participating in collaborative medical education research and evaluation activities undertaken by researchers at the Canadian medical schools, which have an education component focused on regional, rural and remote education.

A MEDICAL SCHOOL FOR REGIONAL, RURAL AND REMOTE AUSTRALIA

On January 29th 2007 the Graduate School of Medicine (GSM) MBBS degree commenced with a class of 80 students. Campus-based learning primarily occurs in new medical school buildings on UOW’s Shoalhaven and Wollongong campuses. Clinical experiences are taking place in clinician offices/hospitals/other community health facilities within the Shoalhaven and Illawarra and other regional and rural areas throughout NSW.

Regional rural and remote Australia is experiencing a shortage of doctors. The GSM aims to address this problem through a selection process that is positively biased towards students who have demonstrated ties with regional rural and remote Australia (including dedicating up to three places annually for Indigenous Australians). These ties will be nurtured and strengthened throughout the medical degree and all students will be expected to elect clinical placements in rural and remote areas. The students will develop an understanding of what it means to practice medicine in these communities by experiencing the realities of practicing medicine in regional rural and remote areas.

While the GSM will focus on training doctors to work in regional rural and remote areas, the students will receive a broad-based training that will ensure an entrance into any career in medicine including all the medical specialisations. research students between the institutions.
UNIVERSITY OF BRITISH COLUMBIA (UBC): EDUCATION FACULTY

Associate Professor Garry Hoban, from UOW's Faculty of Education has been developing a new learning tool to help teachers explain scientific principles to children. The learning tool utilises a new form of animation, called Slow Motion Animation (Slowmation), a simplified version of the commercial Claymation process whereby malleable Crayola Dough models are photographed from above along a horizontal plane in a sequence of poses.

Associate Professor Hoban believes Slowmation can help teachers and students create their own short, slow-motion QuickTime films in order to understand concepts involving change, which is particularly useful in science education. Since Slowmation encourages the analysis of a process into its smallest parts and its synthesis into a whole product it also facilitates other connected learning processes, such as researching information, planning and writing a story, designing models, using technology and team work.

His application of Slowmation in teacher education programs was recognised in 2006 by the Society for Information Technology and Teacher Education, which awarded him the prestigious Technology Leadership Award for “Exemplary Use of Technology to Teach Content in a Teacher Education Methods Course”.

He is expanding collaborations with science educators at the University of British Columbia, who are interested in using this new approach in their own teacher education courses. Together with researchers at Monash University, Associate Professor Hoban will help UBC analyse the value of Slowmation to pre-service teachers. This work will investigate whether the concept of Slowmation can help students understand particular scientific concepts.
Professor Diana Wood Conroy and her team from the Sonic Arts Research Network (SARN) in the Faculty of Creative Arts have been involved in the Paphos Theatre Excavation in Cyprus since 1996, working with University of Sydney Excavation Director Professor Richard Green. Through a series of field trips to the site UOW SARN researchers have discovered that the special acoustics within the semicircular theatre are caused by the innate hardness, density and crystalline structures of its architecture, comprised of sandy limestone, marble, granite, plaster and pebble floors. The UOW team have been able to map the Greco-Roman theatre at Paphos through sound and image. By relating acoustics to archaeological drawings and photography, the researchers seek to understand how ancient theatres can provide new insights into cutting-edge electronic technologies for contemporary artists. They hope to apply the knowledge gained from the Paphos excavation to a variety of live performances at the UOW.

“IT’S FASCINATING TO REALISE THAT THE ANCIENT THEATRE BROUGHT TOGETHER ARCHITECTURE, SCULPTURE, PAINTING, POETRY, MUSIC AND DRAMA. WE HOPE TO RECREATE THESE CONVERSATIONS BETWEEN DISCIPLINES IN THE FACULTY OF CREATIVE ARTS,” STATES PROFESSOR WOOD CONROY.
For the last six years, UOW’s Centre for Medical Radiation Physics (CMRP) has been carrying out research into Microbeam Radiation Therapy (MRT) in collaboration with the European Synchrotron Radiation Facility (ESRF), in France.

MRT is an experimental method that utilises the properties of synchrotron light to examine the destruction of tumours. This form of irradiation causes minimal damage to normal tissues. Thus it is potentially useful for the treatment of brain tumours in infants or for those whom other kinds of radiotherapy are inappropriate.

The partnership between UOW and the ESRF was initially established to further the work of the CMRP’s Director, Professor Anatoly Rozenfeld, who first analysed the use of magnetic fields to improve the radiobiological efficiency of radiation therapy.

In 2005, the CMRP research team which also involves Dr Michael Lerch, conducted further experiments on MRT at the ESRF to test the theoretical models they had developed.

Promising results were then obtained in Australia at the end of 2006 on cell survival experiments using the X-ray radiobiological facility granted by the Cancer Institute NSW, in collaboration with Westmead Cancer Research Institute.

The innovative research at CMRP was supported with a DEST Grant under the French-Australian Science and Technology (FAST) Programme and a recent grant from the Cancer Institute NSW.
Researchers at UOW, the Helmholtz Centre for Infection Research (Germany), University of California San Diego (UCSD), and University of Tennessee have discovered an explanation for how a deadly strain of “flesh-eating” bacteria has evolved to produce serious human infections worldwide.

The research, reported in the prestigious journal, Nature Medicine, focuses on the major human pathogen Group A Streptococcus (“strep”). Among the most important of all human infectious disease agents, strep is responsible for a wide range of diseases, ranging from simple throat and skin infections to life-threatening invasive conditions such as necrotizing fasciitis (“flesh-eating disease”) and toxic shock syndrome.

“Strep” colonises various human tissues and can cause infections so severe that amputation is required and repeated infection can lead to life-threatening illnesses such as rheumatic fever. Strep tissue infections are at endemic levels in Aboriginal populations in the Northern Territory of Australia. Worldwide 12 million people are infected by rheumatic fever and rheumatic heart disease, arising from Strep infections and resulting in an estimated 400,000 deaths a year.

Professor Mark Walker, Director of the UOW’s Centre for Medical Bioscience (CMB) is leading a team of researchers developing a targeted vaccine for Strep with the potential to provide protection against a diverse range of diseases caused by Strep, including skin and throat infections, invasive diseases such as toxic shock-like syndrome, and the horrific necrotising fasciitis. The interaction between Strep and the plasminogen activation system is currently being investigated, to identify potential targets for therapeutic intervention.

The collaborative study was initiated during Professor Walker’s Australian-American Fulbright Commission Senior Scholar Award sabbatical in Dr Malak Kotb’s (University of Tennessee) and Dr Nizet’s (UCSD) laboratories, and financed by grants from the National Institutes of Health, the National Health and Medical Research Council, and the Department of Education, Science and Technology (Australia) International Science Linkages Program.
Professor Sara Dolnicar from the School of Management and Marketing in UOW's Faculty of Commerce is an established marketing and tourism researcher who is collaborating with Professor Friedrich Leisch, a statistician based at the University of Munich.

Their successful collaboration over the last decade has been based on common research interests and complementary skill sets, investigating response styles in market research, particularly in the cross-cultural context.

People's responses to surveys have been shown to depend on their cultural background. Response styles can contaminate empirical data sets and negatively affect the validity of marketing research studies. The research between the two Professors aims to improve the validity of empirical studies by accounting for different ways in which respondents answer questionnaires (response styles) while analysing the data.

Surveys tested by Professor Dolnicar are investigating sustainable tourism, public acceptance of alternative water sources and volunteering: three areas which are central to maintaining environmental sustainability and providing social and environmental services which are not covered by the commercial sector. This work therefore is of particular importance in Australia given the range of cultural backgrounds from which residents originate.

In the last three years the collaboration has further strengthened with the integration of a number of postgraduate research students into the team.
The Intelligent Polymer Research Institute (IPRI) has established an international reputation for work at the cutting-edge of intelligent materials research, and actively fosters links with international partners to generate a world-class impact. IPRI’s relationship with Dublin City University (DCU) began almost 20 years ago, when Professor Malcolm Smith was invited to UOW to start a research collaboration involving the control of biomolecular conducting polymer interactions.

This link between IPRI and DCU quickly developed into numerous individual partnerships. Over time these partnerships have greatly contributed to the emerging field of nanobionics - one of the major research strengths of the recently established ARC Centre of Excellence for Electromaterials Science (ACES) at the UOW, of which IPRI is the leading partner.

ACES is developing new electromaterials capable of complex biomolecular and cellular interactions that possess and retain electronic properties, and are capable of stimulating and sustaining cell growth. The same group of materials can also generate significant movement and force in response to small electrical stimuli. These combined properties will provide materials for a new generation of artificial muscles and nerve repair systems, and the novel energy sources required to drive them. The inherent biological and electronic properties of these materials are being enhanced by the use of advances in nanotechnology.

This work is extending the development of dedicated biochemical sensing techniques to monitor body fluids via sensors distributed on a textile substrate. Known as the BIOTEX program, the textile itself becomes the sensor and can be integrated into suitable apparel. This goal, if achieved, would represent a complete breakthrough, which allows for the first time the monitoring of body fluids via sensors distributed on a textile substrate and the simultaneous performance of biochemical measurements. This application could be used by elite athletes to monitor their performance and also by patients during rehabilitation.

The partnership between IRPI and DCU enables an exchange of complementary expertise. Researchers at IPRI provide the fundamental breakthroughs in the materials science which leads to new developments in sensing technologies, while the Irish team are then able to use these outputs in creating biosensing devices for use in medical diagnostics.
The University of Cambridge is one of the oldest and most prestigious universities in the world and one of the largest in the United Kingdom. Its reputation for outstanding academic achievement is known worldwide. Researchers in the UOW Centre for Medical Bioscience (CMB) are working with the Departments of Chemistry and Biochemistry at the University of Cambridge on various collaborative research projects.

EXTRACELLULAR CHAPERONES

Professor Mark Wilson and his research team at the UOW's Centre for Medical Bioscience (CMB) are investigating mechanisms of quality control of protein function and shape in spaces outside cells in the human body. Their project on 'Extracellular Chaperones' will generate new knowledge on the structure and function of proteins likely to protect the human body from a variety of diseases such as Alzheimer's and Mad Cow Disease.

The human body depends upon the maintenance of proteins in their normal (native) shapes to ensure their correct function. When proteins age or are damaged, they unfold and may aggregate and precipitate, which in turn may cause disease. Although mechanisms to control the shape and function of proteins found outside human cells are important, their identity and details of how they operate are largely unknown.

The researchers at the CMB have pioneered the discovery of extracellular chaperones (ECs) which are proteins found in blood that bind to unfolding proteins to prevent their aggregation. Clusterin has arguably the first established abundant human EC.

CELL UPTAKE

Further to this discovery, UOW researchers have provided evidence that ECs can dispose of misfolded extracellular proteins by forming soluble complexes with them and then facilitating their disposal via cell uptake.

This research is supported by a vigorous collaboration between UOW researchers and researchers at the University of Cambridge's Department of Chemistry (which houses a major centre of expertise in protein folding and associated diseases).

MASS SPECTROMETRY

Links with Professor Carol Robinson's Mass Spectrometry Laboratory at the University of Cambridge were initiated at least 10 years ago by Professor Margaret Sheil and have continued with the appointments of Dr Jennifer Beck (Chemistry) and Dr Andrew Aquilina (School of Biological Sciences).

Dr Beck and Professor Shell pioneered the use of mass spectrometry in Australia to study complexes of biological molecules such as proteins and DNA and their complexes with small molecules including drugs. This work was aimed at discovering the ways in which molecules recognize one another and may aid in the design of better antibiotics and chemotherapy drugs. Links with the Mass Spectrometry Laboratory in Cambridge will be strengthened by UOW researchers access to a new type of mass spectrometer at Cambridge. This ion mobility mass spectrometer can not only measure the mass of proteins, but can provide information about their shape, and will provide unprecedented information about complexes of biological molecules.

Dr Aquilina has also applied mass spectrometry to the study of protein complexes, in particular, small heat shock proteins (sHSPs). He spent two years in the laboratory of Professor Carol Robinson in Cambridge. Dr Aquilina's work has provided insights into subtle structure-function perturbations of a sHSP found in the human eye lens, which may contribute significantly to the onset of nuclear cataract.

NEW PROTEIN TECHNOLOGIES

Natural Darwinian evolution relies on cycles of random genetic change, followed by selection for an improved function: survival of the fittest. In recent years, it has become possible to mimic natural evolution in the laboratory to select new proteins that have new, even non-natural, functions. These experiments are done in test tubes, without using living organisms. For example, we can now contemplate "evolving" new protein (enzyme) catalysts for chemical reactions that do not occur in nature.

Professor Nick Dixon's research group within the School of Chemistry is involved in a program that aims to do this, in collaboration with Cambridge scientists Professor Chris Abell and Dr Florian Hollfelder in the Departments of Chemistry and Biochemistry, respectively, and scientists at ANU in Canberra and in CSIRO Divisions in Melbourne, Sydney and Canberra.

The approach is to produce small cell-size droplets in microfluidic devices. Each droplet will contain the cellular machinery for:

(i) replication of a particular DNA molecule containing a single randomly-modified gene,
(ii) copying of the gene to make messenger RNA, and
(iii) for reading the resulting RNA code to make an enzyme that is specified by the DNA code in the individual gene in the droplet.

In this way, each one of billions of droplets ends up containing a different gene as well as the potential new enzyme it codes for. All that is needed to find the new catalyst. The challenge is to be able to do this with billions of droplets within a few days. This ambitious project uses seed funding provided by the Australian National University (ANU) and CSIRO via a CSIRO Emerging Sciences Program entitled "Synthetic Enzymes for Synthetic Chemistries".
The replisome is a dynamic molecular machine that contains many different proteins that interact with each other in a perfectly orchestrated way to copy both strands of DNA in cells that are about to divide. The Dixon and Beck groups are collaborating with Cambridge researchers to use mass spectrometry to develop new understanding of the protein interactions in the bacterial replisome.
A cross-cultural comparative study involving Professor Jan Wright and Dr Valerie Harwood from the Faculty of Education at the UOW will investigate the impact of attitudes and policies relating health issues on school policy and practices.

Three Institutions: UOW, Loughborough (UK) and the University of Otago in New Zealand, are involved in the study which will conduct parallel projects and participate in the analysis and interpretation of data which will serve to inform health policy and practice in schools, the wider community and in each country.

A focus of current public health discourse is the relationship between childhood inactivity, young people's diets, and a steep rise in obesity. This focus drives major policy initiatives on health, and schools in particular have been targeted.

Collaborating researchers are investigating how prevailing attitudes and practices relating to ‘obesity’, food, physical activity and health are embedded in and shaping school policy and are reflected in the curriculum, actions and attitudes of teachers. They are also examining how this in turn impacts on young people’s attitudes and understandings of their own and others’ health, in particular in relation to physical activity and food.

The research which was initiated in 2006, is funded under the ARC’s Linkage International scheme, as well as other funding agencies in the UK and NZ.
MINISTRY OF HEALTH
UOW’s Centre for Statistical and Survey Methodology (CSSM) has entered a statistical collaboration agreement with New Zealand’s Ministry of Health.

Professor David Steel in the Faculty of Informatics and Director of the CSSM has been working with the Public Health Intelligence (PHI) Unit in the New Zealand Ministry of Health and has established an effective collaborative relationship. A contract signed at the University between the CSSM and Public Health Intelligence involves funding of up to $NZ225,000 over two years (2006-2007).

Professor Steel said the working relationship to date has involved the presentation of courses, joint conference papers and extensive sample design work by the CSSM Deputy Director, Dr Robert Clark, for the NZ Health Survey, which has recently gone into the field.

The partnership will involve a range of collaborative activities including:

- Providing assistance to Public Health Intelligence (PHI) in the area of statistical expertise;
- Assisting PHI to develop capability in the design and analysis of health surveys and the analysis of health data;
- Ad hoc analysis and research services for PHI;
- A scholarship program to support selected Masters and PhD students studying in relevant areas;
- A joint program of research projects, and
- A training program in statistical analysis and health survey design and analysis.
a snapshot of our national research partners
The pressing need for new and innovative methods of collecting, analysing and utilising statistical information recently prompted the Australian Bureau of Statistics (ABS) to formalise its existing alliance with UOW.

Under the terms of a five-year Memorandum of Understanding (MOU) signed in 2006, the ABS agreed to sponsor a new Chair (Professorial Fellow) for UOW’s Centre for Statistical and Survey Methodology (CSSM) and provide support for at least two Australian Research Council (ARC) Linkage Grants in this field. In return, the CSSM which appointed Professor Ray Chambers, formerly Director of the Southampton Statistical Sciences Institute at the University of Southampton as Chair, will oversee various research projects and develop training courses in statistical methodology. These initiatives will help the ABS minimise the costs of data collection, maximise the use of existing data and train the next-generation of statisticians.

"Statistical methodology is an area of critical importance to the ABS and other providers of statistics. It requires specialist training to ensure quality statistics are produced for Australia. It is increasingly important in the information age and there is need for more people with these skills," states Dennis Trewin, Australian Statistician from the ABS.

This new MOU formalises a longstanding partnership between the ABS and UOW. Since 1995, the ABS has been an industry partner in four ARC Linkage Grants with UOW and has sponsored undergraduate scholarships and cadetships for honours students studying Applied Statistics within UOW’s Faculty of Informatics.
In the last three years, Professor John Bremner and his team in the Centre for Medicinal Chemistry and Pharmacology have established a progressive working partnership with Avexa, resulting in many measurable outcomes and patents. Together they are developing new drug formulations to treat bacterial infections that have become resistant to existing antibiotic treatments.

The emergence of these bacterial strains or “superbugs” has created a major healthcare problem in the treatment of infections typically acquired in hospitals during the use of intravenous devices.

Funded by a National Health and Medical Research Council Development Grant, this research project originally focussed on treatments for bacteria that had become resistant to the glycopeptide antibiotic, vancomycin.

During the optimisation of new compounds, detailed in-vitro studies revealed a unique spectrum of activity against both vancomycin-resistant bacteria and other resistant forms of Staphylococcus aureus. In particular, the new compounds show great promise for the treatment of two common superbugs - MRSA, commonly known as Golden Staph, and methicillin resistant Staphylococcus epidermidis. Thanks to these unexpected discoveries, these infections may one day be easily treated.

“This is a significant increase in the value of this research program as it shows that it can target the bacteria that cause serious hospital infections. We are excited by the results and the progress we have made,” states Avexa CEO Dr Julian Chick.

This work is being conducted in conjunction with Avexa, an Australian biotechnology and research drug company based in Melbourne that originated from Amrad.
The Bionic Ear Institute (BEI), St Vincents Hospital and UOW's Intelligent Polymer Research Institute (IPRI) have worked together at the cutting-edge of bionics, combining their knowledge of the human body and intelligent materials to develop life-enhancing applications since 2001.

This partnership is currently working to improve the performance of the Cochlear Implant (Bionic Ear), initially pioneered by Professor Graeme Clark at BEI and now a routine therapy that has enabled 50,000 hearing-impaired people to hear and communicate effectively.

Professor Gordon Wallace and his team at IPRI are using their world-renowned expertise in the design and synthesis of organic polymers to build new plastic materials to be used in the Bionic Ear. They have embedded the plastics with tiny carbon nanotubes, cylindrical forms of the carbon molecule, which are 50,000 times smaller than a human hair, and capable of conducting electricity. They have also incorporated nerve growth factors into the plastic to encourage nerve cell growth in the human ear by transmitting important bioactive molecules identified by BEI.

"Studies have shown that the quality of sound depends on the firing patterns in the auditory nerves. To reproduce how the brain codes sound we need more electrodes to allow finer patterns of firing, and we also need to preserve as many nerve fibres and hair cells as possible. Thanks to our ongoing work with IPRI we should have a much better Bionic Ear within 10 years," Professor Clark explains.

The ARC Centre of Excellence for Electromaterials Science (ACES) is a collaboration between four key partners; the IPRI, BEI, St Vincents Health in Melbourne and Monash University.

This combination of researchers is investigating the development of a spinal cord implant, that can be inserted into the damaged area of a patient's spinal cord. An electrical stimulus makes the implant release nerve growth hormones that encourage damaged spinal nerves to regrow and eventually reconnect with other nerves.
They are the two biggest shows in town - BlueScope Steel and the University of Wollongong - the traditional industrial powerhouse and one of Australia’s leading educational institutions that was originally established to service the steel industry.

Between them they contribute well over $1 billion annually to the Illawarra economy and employ more than 7,000 people, so have a massive impact on the region’s prosperity. And each has a significant impact on the other’s success.

As UOW Vice-Chancellor, Professor Gerard Sutton puts it: “The University and BlueScope Steel have a shared past, and we are looking forward to a shared future. Our two organisations have strong links through research, scholarships, support and training partnerships, as well as our shared responsibility for driving the economic well-being of the Illawarra region.”

UOW and the steel company have had close links from the beginning, with the need to train technical staff for BHP’s Port Kembla Steelworks one of the prime reasons for the establishment in 1951 of a Wollongong division of the NSW University of Technology.

That grew into the Wollongong University College, with a central role to train metallurgists and other technical staff for the Steelworks through the 1950s and 1960s. BHP made major contributions of land and building materials as the University College flourished.

The University of Wollongong gained full autonomy in 1975, and has grown into a diverse institution offering a wide range of courses apart from its traditional engineering strengths.

UOW still has many close links with BlueScope Steel, with the biggest current collaboration through the BlueScope Steel Metallurgy Centre.

The Centre was established in 2004, evolving out of the previous BHP Institute for Steel Processing and Products, which had been operating since 1995. The Centre provides technical research support to BlueScope Steel, as well as formal postgraduate education. It has built up specialised equipment infrastructure that is shared by the University and company employees in a unique arrangement.

Over the years BlueScope Steel and UOW have combined to gain a large number of nationally competitive research grants, resulting in millions of dollars worth of additional research funding coming to UOW. The company also funds Work Integrated Learning Scholarships for Bachelor of Engineering and Bachelor of Commerce students, and has a cadetship program at Port Kembla which provides opportunities for Engineering students to combine work at the Steelworks with study at UOW for degrees in Mechanical, Civil, Computer, Electrical and Materials Engineering.

BlueScope Steel has also sponsored UOW Racing car entry in the Formula SAE competition for Engineering students for the past six years. Designed, built and raced by students, the UOW team has won a number of competitions in Australia and overseas.
Established in 2004, the Centre for Health Initiatives (CHI), previously known as the Centre for Health Behaviour and Communication Research (CHBCR), is a UOW strategic research initiative of the Faculty of Health and Behaviour Sciences. By combining the disciplines of marketing and health behaviour, the CHI seeks to understand how the media and other communication mediums influence peoples' lifestyle choices regarding their health.

A recent three-year Australian Research Council Linkage Grant between CHI and The Cancer Council New South Wales (Cancer Council) has enabled the development of new skin cancer awareness campaigns through the principles of social marketing. Social marketing is a knowledge-based discipline grounded in behavioural and communications theory that has developed from commercial marketing, with an underlying difference of being driven by a motivation to change consumer behaviour for the social or individual 'good', rather than company profits. Social marketing has been widely used in the areas of smoking cessation, healthy eating, drug use and physical activity promotion. However there is no documented evidence on how best to utilise social marketing within sun protection campaigns.

By reviewing existing campaigns, analysing literature and conducting formative research, the CHI is helping the Cancer Council develop evidence-based guidelines for the development of sun protection interventions.

Skin cancer is the most common form of cancer in Australia, with incidence rates outnumbering all other forms of cancer by more than three to one. Thanks to the large-scale collaboration between CHI and the Cancer Council more people may be persuaded to fully protect themselves from the sun.

“SKIN CANCER IS THE MOST COMMON FORM OF CANCER IN AUSTRALIA”
Real-time, interactive, and untethered networked services are becoming increasingly important for group interaction in several domains such as entertainment, collaboration, and education. These applications require a new set of capabilities from the underlying network and server infrastructure to perform satisfactorily on large-scale. The Centre for Emerging Networks and Applications (CENA) is involved in the development of these new applications and the underlying network and server infrastructure required, with its partner Smart Services CRC.

CENA Director, Professor Farzad Safaei recently managed to secure the UOW’s involvement with the new Smart Services CRC, an evolution of the Smart Internet Technology CRC (Smart Internet) which the UOW was previously involved in from 2001. Cooperative Research Centres (CRCs) are designed to encourage collaboration between industry, educational institutes and government by transferring research outputs into commercial or other outcomes of economic, environment or social benefit to Australia.

Key commercial outcomes of research projects conducted by UOW staff in association with the Smart Internet Technology CRC include:

- **enikos** - was formed to commercialise the results of several years of groundbreaking research and development in the area of multimedia delivery at UOW, offering next-generation software for multimedia applications. It has developed a framework and set of software solutions based on the MPEG-21 standard.

- **Spatial Voice (SV)** - is the result of research funded by the Smart Internet Technology CRC, led by the UOW’s Dr Paul Boustead and Professor Farzad Safaei and their teams. Following successful large scale trials conducted by Telstra in the Broadband ELab located in Launceston Tasmania, SV Corporation, a Smart Internet Technology CRC spin-off company, was formed mid 2006 to bring the Spatial Voice technology to market. The outcomes of this research include several patents that enable communication in large groups online. Several of these patents have formed the basis for the development of the SV Corporation voice communication products.
The Cooperative Research Centre for Railway Engineering and Technologies (Rail CRC) was established in 2001 as part of the Australian Government’s Cooperative Research Centres Programme. The Centre commenced as an unincorporated joint venture between six universities and six major Australian rail companies - the first transport-related CRC in the programme’s history.

In 2007, the new CRC for Rail Innovation grew out of the Rail CRC and is arguably the premier rail research centre in the nation, with the combined expertise of more than 150 researchers working collaboratively with industry partners to deliver valuable research, knowledge and innovation to the railway industry.

With participants across freight and urban systems, rail operators and track owners combined, Rail Innovation has been charged with increasing rail’s efficiency, reliability, safety and skills through world-leading research for the betterment of the Australian rail industry and the community at large.

UOW’s work with Rail Innovation focuses on innovative automated track maintenance and upgrading technologies aimed at improving the integrity of track structure, which is essential to safe and reliable rail operation.

THE YOUNG RAILWAY ENGINEER OF THE YEAR IN AUSTRALASIA

UOW PhD student in the Rail CRC Behzad Fatahi has been awarded the 2007 Railway Technical Society of Australasia (RTSA) Young Engineer Award which recognises young professional engineers, technologists or associates in Australia or New Zealand under the age of thirty, and have reached a demonstrated level of achievement and involvement in the field of railway engineering. Behzad’s research project demonstrates that railway infrastructure can be improved by identifying and managing surrounding vegetation - refuting the age-old belief that vegetation is detrimental to railway tracks. Mr Fatahi was supervised by Professor Buddhima Indraratna and Dr Hadi Khattabaz and his research was part of a larger project under the CRC for Railway Engineering.
There is a growing problem in Australian public sector organisations regarding the loss of corporate knowledge caused by staff turnover. In organisations such as the Department of Defence, an ageing workforce, downsizing and difficulties with recruitment and staff retention have compounded the problem. As a result, knowledge loss is increasingly considered a serious risk.

The Director of UOW's Centre for Knowledge Management, Dr Peter Massingham, has been working with the Department of Defence on a collaboration with the Royal Australian Navy’s (RAN) Navy Systems Branch (NAVYSYS), led by Commodore Peter Marshall and NAVYSYS Director Mr Ray Duggan. The project is investigating a theoretical model to assess the impact of knowledge loss in NAVYSYS and potentially in other industry sectors and help NAVYSYS to develop into a learning organisation. It will also contribute to one of the Australian's Research Council’s priority research areas, Safeguarding Australia.

The Centre for Knowledge Management is a research centre within the School of Management and Marketing, Faculty of Commerce.

The Australian National Centre for Ocean Resources and Security (ANCORS) is a centre of excellence in oceans governance and maritime security knowledge services in Australia and is a leading contributor to the Oceans and Transnational Security ‘Research Strength’ within UOW. ANCORS and the Royal Australian Navy (RAN) have forged a very successful research partnership, established via an MOU, which has been in place since 1994. Under the MOU, ANCORS provides research to the Seapower Centre, Australia to support the RAN’s maritime strategic objectives.

ANCORS has undertaken a range of successful maritime strategic research tasks under the MOU. An example was the project entitled ‘The Development of a Model for an Environmentally Sustainable warship.’ The objective of this project, that commenced 2004 and was completed in 2005 was to provide the Royal Australian Navy with a strategic assessment of trends in international and domestic environmental law, policy and standards over the next 20 years, and the extent to which these may impact on future ship design and naval operation. The findings have been published as “Future Environmental Policy Trends to 2020: Impact on ship Design & Operations, Papers in Australian Maritime Affairs, No.13 2005”.

The research provided the RAN with the necessary information to develop a strategic approach to warship design and operation to meet domestic and international environmental requirements and standards. Directly, the project outcomes influence the standards for the RAN’s future war ship design and acquisition strategy to comply with international and domestic marine environmental regulatory requirements.
Associate Professor Nigel Taylor from the Human Performance Laboratories within UOW's School of Health Sciences has been investigating how people in the military deal with various types and levels of stress. He has been working with DSTO's Human Protection and Performance Division since 1995 and has been able to collaborate with DSTO on a variety of projects including, problems encountered in heat and with a particular emphasis upon the physiological impact of work, clothing and equipment.

During military operations and exercises in northern Australia, soldiers frequently have been transferred from the cooler southern states and have been required to operate at peak efficiency shortly after arrival in the tropic conditions of the north. The soldiers have not been heat acclimatised and are usually prone to varying degrees of heat strain during operations. UOW researchers have been looking at various heat acclimation regimes from the perspective of body-fluid changes, to assist soldiers reach their peak performance physically and psychologically.

The collaboration with DSTO has enabled many of Associate Professor Taylor's research students to find employment with DSTO, and also funds future research projects within the UOW's Human Performance Laboratories.
During 2006 UOW successfully secured more than $3.6 million to host and lead a partnership of academic institutions and industry partners to host an Eastern Australia Dementia Training and Study Centre.

The centre aims to provide a positive impact on Dementia care in Australia, through the delivery of tertiary based education and training activities. The partnership of four academic institutions and four industry organisations will service metropolitan NSW, ACT and Queensland in dementia training.

UOW is the lead partner of the four academic institutions involved: Queensland University of Technology, Griffith University, and University of Sydney. The four industry partners involved in the Centre are Hammond Care Group, Uniting Care, Blue Care and RSL Care.

The Centre, directed by Associate Professor Victoria Traynor, will have a significant impact on the training of health professionals across disciplines to improve care to clients with dementia and their carers, with projects to develop and promote undergraduate and postgraduate dementia curricula and training resources.

Nurses, medical students, medical specialists, social workers, diversional therapists and psychologists are among the professionals who will benefit from the Centre's programs.

National Project Coordinator, Professor Patrick Crookes believes the Centre is a result of the incredible work already achieved by the Nursing Schools at both UOW and the Queensland University of Technology.
Eighty-eight thousand Australians will be diagnosed with cancer this year. Just over half will make a full recovery. Although survival rates are improving, this insidious disease is still the leading cause of death in Australia, afflicting one in three men and one in four women before the age of 75.

Fortunately the fight against cancer in this country is being facilitated by a remarkable partnership between UOW researchers and local community groups. What began as a simple donation has grown to significant financial support for UOW researchers and fostered community engagement in this vital area of research.

Since 2006, almost $300,000 has been raised by the Illawarra Cancer Carers and the Robert East Memorial Fund for cancer research led by Professor John Bremner and his team from the Department of Chemistry and Professor Philip Clingan, an Honorary Clinical Professor at the Graduate Medical School (UOW) and Director of the Illawarra Cancer Care Centre.

This large, multidisciplinary team of chemists and biologists has been working together for eight years to reduce the debilitating side-effects of drugs used in chemotherapy. Specifically, the team is developing a new formulation for an effective cancer-fighting drug, 5-fluorouracil (known as 5-FU) that will drastically reduce its known side-effects.

The research team is currently performing pre-clinical analyses of toxicity and the effectiveness of the novel 5-FU formulation using human cancer mouse models. If ultimately successful in human clinical trials, the drug combination should greatly ease painful side-effects and improve the treatment of certain cancers like colo-rectal cancer.


since 2004, Johnson and Johnson Research Pty Limited has been working with researchers at UOW to develop new pharmaceuticals from natural products. The research team, headed by Professor Stephen Pyne, moved to new laboratories within UOW’s Department of Chemistry in 2005 and have expanded the research into natural product chemistries with potential as new anti-infective pharmaceutical drugs. Patents protecting these discoveries are under development. This success has led to extended funding for 2006-2007 to further develop the new work.
nsw department of environment and climate change, and the nsw rural fire service

“A KEY OBJECTIVE IS TO
ESTABLISH RESEARCH
PROJECTS THAT WILL BETTER
INFORM AND DEVELOP FIRE
MANAGEMENT”

CENTRE FOR ENVIRONMENTAL RISK MANAGEMENT OF BUSHFIRES

Identifying the need to better understand the way in which bushfires shape our environment, has resulted in the NSW Department of Environment and Climate Change (DECC) and the NSW Rural Fire Service (NSW RFS) joining forces in 2006 to establish the University of Wollongong Centre for Environmental Risk Management of Bushfires (CERMB). The Director of the centre is Professor Ross Bradstock who was seconded to the position from DEC for a period of five years.

A key objective of CERMB is to establish research projects that will better inform and develop fire management and improve our fundamental understanding of bushfires. These are issues that are fundamental to the interests of DECC, RFS and other land managers. This is important not only for the protection of people and property, but also for National Parks and reserves and other bushlands, to maintain the diversity of plant and animal species. Wise management of bushfires will also have important consequences for the maintenance of air and water quality, and other catchment values.

With an emphasis on the Sydney region, research projects are being conducted in collaboration with Australian National University and the University of New South Wales under funding from the NSW Greenhouse Office, NSW Environmental Trusts, Australian Greenhouse Office (DEH), Bushfire CRC and the Australian Research Council.

CERMB is already involved in many projects, ranging from understanding how plant species are distributed along macro gradients of temperature and moisture at regional scales, to long-term computer simulation of fire activity under climate change and differing scenarios of management. The primary aim of the work is to understand how fire regimes and vegetation may change not only by global warming, but also by changes to human populations and other factors such as invasive species. This will provide a basis for assessing risk to people and their properties, effects on biodiversity and the sort of management approaches needed to cope with future environmental change.

The research capacity of CERMB will be enhanced through the appointment of a Research Fellow funded by the NSW Rural Fire Service. This position will be devoted to producing a better understanding of fire risk to urban and rural communities and to develop technology that will improve risk management planning in NSW.
Volunteer work in Australia has an estimated dollar value of A$42 billion per annum, with 4.4 million Australians contributing 704 million hours for the benefit of their communities. However, Australian volunteer-based organisations increasingly face problems in attracting new volunteers. One of the main reasons for this lies in the multicultural structure of Australian society.

In highly heterogeneous communities a diverse range of values and beliefs motivate people to volunteer, with an equally diverse range of responses to volunteer participation. This heterogeneity has so far been ignored, leading to significant problems in volunteer recruitment.

Professor Sara Dolnicar from the School of Management and Marketing in the Faculty of Commerce is working with Mr Paul Formosa, Natural Areas Coordinator for Wollongong City Council, to gain an insight into the volunteering market in a multicultural society. This is achieved by conducting an integrated market structure analysis for the volunteering industry, simultaneously investigating existing community subgroups with regard to volunteer participation motives as well as image perception of volunteer-based organisations.

Wollongong Bushcare (a program within the Wollongong City Council) is an ideal partner for this study as it represents a broad community-based organisation in a region characterised by high cultural diversity. Wollongong Bushcare aims at managing, protecting and rehabilitating the natural areas in the Wollongong region. It has identified the problem of volunteer recruitment due to differences in the cultural backgrounds of community members and is in need of a solution to this problem.

While the research partnerships aims to gain a deeper insight into the phenomenon of attracting volunteers in multicultural societies in general, Wollongong Bushcare will also gain an in-depth understanding of what motivates different subgroups within their community to participate in volunteer activities and what prevents them from volunteering. Consequently, Bushcare will be able to target specific subgroups with customised messages, leading to a maximisation of the volunteer potential and hence benefiting the natural heritage preservation in the region.
research strengths

2007–2009
Institute for Superconducting and Electronic Materials (ISEM)

Director: Professor Shixue Dou
www.uow.edu.au/eng/research/ISEM/

ISEM has established itself as a world class cooperative research team in energy, superconducting and electronic materials science and technology, and has been instrumental in the technological and commercial development of this research field in the Australian industry. ISEM aims to maintain an awareness of emerging science and technology from around the world, promote the commercialisation of energy, superconducting and electronic materials technology to sponsoring companies, enhance the existing strong, national and international links in the field, and contribute to the education of high quality postgraduates and postdoctoral fellows.

Intelligent Polymer Research Institute (IPRI) | ACES

Director: Professor Gordon Wallace

IPRI is recognised internationally as a pioneer in intelligent polymer research with strategic links and alliances with other research institutions in the USA, Japan, Korea, Italy, Ireland and the UK. IPRI is also the leading partner and main administrative centre for the ARC Centre of Excellence for Electromaterials Science. The Centre was formally opened in February 2006 and is a collaborative partnership between IPRI, Monash University, The Bionic Ear Institute, and St Vincents Health in Melbourne. The main aim of the centre is to explore the science of nanomaterials having an electron or charge transfer functionality: to prepare such nanomaterials, study and develop theories for their behaviour, and exploit these new behaviours in useful applications. An ethical dimension is also included to monitor the impact of such developments on the community as a whole.

Oceans and Transnational Security (OTS)

Director: Professor Martin Tsamenyi
ancors.uow.edu.au/

OTS is a major national hub for research into issues of national, regional and international security. It seeks to enhance the capacity of Australia and other states in the Asia-Pacific region to combat new threats, with a particular research focus upon maritime and other transnational challenges to security. Its five research programmes comprise: Maritime Strategy and Security; Oceans Governance and Law of the Sea; Marine Resources and Environmental Protection; Transnational Crime; and Terrorism.

Telecommunications and Information Technology Research Institute (TITR)

www.titr.uow.edu.au/

The TITR has two primary objectives: (i) To carry out leading edge basic and applied research in future multimedia information communication systems and services, and (ii) to utilise its expertise and reputation to enable and stimulate development of IT&T based industries centred in the Illawarra. The envisaged outcomes are national and international recognition as a centre of excellence in IT&T which attracts high calibre students and industry collaborative research, and new employment opportunities in the region. TITR is involved in the CRC for Smart Services and the CRC for Desert Knowledge.

Centre for Asia Pacific Social Transformation Studies (CAPSTRANS)

Director: Dr Lenore Lyons
www.capstrans.edu.au/

The Asia Pacific region offers unique insights into social transformation processes triggered by national and international development policies and their effects at local, regional and transnational level. The Centre for Asia Pacific Social Transformation Studies (CAPSTRANS) seeks to examine these processes through innovative research by combining methods from a variety of disciplines, including political science, economics, management studies, sociology, anthropology, media studies, social history and language and literature studies. CAPSTRANS is an Australian Research Council Key Centre for Teaching and Research and a joint venture of UOW and the University of Newcastle.
Centre for Health Service Development (CHSD)

**Director: Professor Kathy Eagar**
http://chsd.uow.edu.au/

CHSD was established in 1993 to undertake a continuing program of active research into methods to improve the management and provision of health and community care services with the goal of making a significant contribution to improving the funding and delivery of health and community care services in Australia. Ideas of improvement include achieving greater equity in the distribution of resources, promoting fairer access to services, better continuity within and across the health and community care sectors, and basing management decisions on evidence.

Centre for Medical Bioscience (CMB)

**Director: Professor Mark Wilson**

The new Centre for Medical Bioscience (CMB) is a research intensive grouping with a focus on medically relevant aspects of biology. Currently the grouping consists of 17 post-doctoral scientists and 31 higher degree research students and spans a broad range of research areas from mass spectrometric studies of biological molecules to cancer cell biology. The vision of this new centre is to become quickly established as the principal bioscience research arm of the Illawarra Health and Medical Research Institute (IHMRI), providing a valuable research platform underpinning the new Medical School.

Centre for Medical Radiation Physics (CMRP)

**Director: Professor Anatoly Rozenfeld**
mrp.uow.edu.au

CMRP is a research team within the School of Engineering Physics, UOW. The centre is dedicated towards the development of semiconductor radiation detectors and dosimetric instrumentation for clinical applications in radiation oncology and nuclear medicine, radiation protection as well as high energy physics applications. CMRP has a strong research program in external beam radiotherapy IMRT and IGRT and proton therapy. Core Objectives of CMRP include: excellence in research and development in the field of radiation instrumentation and measurements with particular emphasis on medical and high energy physics applications, excellence in teaching (BSc, MSc, PhD) medical physicists and engineers for research and clinical careers and active collaboration with local and international institutions to facilitate broader research efforts in new radiation oncology modalities and nuclear medicine applications.

Centre for Medicinal Chemistry and Pharmacology

**Director: Associate Professor Paul Keller**

The CMCP is a medically focussed research group investigating both fundamental and applied science of molecular based systems. The main aims of the Centre include, enhancing our understanding of the molecular basis of disease, modern drug design and development leading to new pharmaceuticals, maintaining and developing collaborative links with other researchers, industry and centres of excellence, and providing an exceptional training centre for Post-graduate students in medical chemistry and biomedical research fields for the growing Australian biotechnology market.
Centre for Statistical and Survey Methodology (CSSM)

**Director:** Professor David Steel

http://cssm.uow.edu.au/

CSSM, the Centre for Statistical and Survey Methodology (CSSM) is a centre of excellence in statistical design and the analysis of complex populations. It undertakes fundamental research, industry focussed research, contract research, major consulting projects and training involving statistical methodology. It focuses on how to efficiently obtain and analyse data from populations in the real world that do not have the simple structure often assumed in traditional statistical methods. The centre has expertise and research projects in: survey design and analysis; complex data analysis; experimental design and analysis; data mining; spatial and small area statistics; statistics in quality; privacy and confidentiality; combining and analysing data from different sources, bioinformatics and statistical education.

Engineering Manufacturing (EM)

**Director:** Professor John Norrish

www.uow.edu.au/eng/research/manufacturing/

The Government’s Advanced Manufacturing Action Agenda recognizes the need for innovation in product and process development in order to maintain an Australian advanced manufacturing industry. The Engineering Manufacturing Strength at UOW addresses this need directly with internationally recognised research capabilities in advanced robotics, advanced welding joining technology, precision machining, metal forming, power electronics, thermo-fluids, computational and experimental mechanics and control engineering. These capabilities are underpinned by an established power quality research arm which ensures the efficient and compliant use of energy. Engineering Manufacturing at UOW is in a unique position to generate innovative solutions for Australian industry.

Engineering Materials Institute (EMI)

**Coordinator:** Professor Geoff Spinks

www.uow.edu.au/eng/research/emi/

The Engineering Materials Institute (EMI) conducts research into the design, synthesis and characterisation of advanced materials for engineering applications. While maintaining a special interest in ferrous metallurgy, the span of activities also includes light alloys, polymers, composites and nano-materials.

GeoQuEST Research Centre

**Director:** Professor Colin Woodroffe


The GeoQuEST Research Centre in the Faculty of Science aims to bring together outstanding researchers from the disciplinary traditions of Geography, Geology and Environmental Science who share central interests in earth and environmental processes, including human interactions and climate change. It fosters excellence in research through an enviable record of successful grant applications, publications and higher degree research training.

The Institute for Conservation Biology and Law

**Director:** Associate Professor Sharon Robinson


Formed in 2001, the Institute for Conservation Biology and Law is unique in combining expertise in Conservation Law and Policy with strong research into the Biology of Australian flora and fauna. ICB combines expertise in three core research areas: Evolutionary Biology, Environmental Biology and Conservation Law and Policy. Within the two scientific themes we aim to perform world class research into the evolution, ecology and physiology of Australian biota. The research of many academics within the Institute encompasses more than one of these discipline areas, with the majority of staff seeking to link science with law and policy to achieve better conservation outcomes.

Smart Food Centre (SFC)

**Director:** Professor Linda Tapsell

www.uow.edu.au/health/smartfoods/

As a Key Centre of Teaching and Research established in 1999 by the Australian Research Council and UOW, The Smart Foods Centre forms an alliance between government, university and the food industry to benefit all Australians through nutrition-related research and education. Building on a nucleus of internationally recognised expertise in nutritional science and human biology at the UOW, it provides Australia’s food industry with a unique set of resources to aid in the development of a better food supply in terms of health, consumer acceptance and value-adding to exports.
UOW Research Networks and Initiatives
The University of Wollongong (UOW) and South Eastern Sydney Illawarra Health (SESIH) have a long history of collaboration, through joint research projects, operation of a joint Human Research Ethics Committee and student supervision and placements. A further extension of this relationship is the creation of the Illawarra Health and Medical Research Hub in 2007, which is a focal point for health and medical research being undertaken within the Illawarra region. Within the Hub there are two core Research Units:

- the Illawarra Health and Medical Research Institute (IHMRI);
- the Centre for Health Service Development (CHSD)

Underpinning these research units will be a Clinical Trials Unit, which will become a hub for clinical trial activities in Australia. Within the Illawarra Health and Medical Research Hub, the creation of the Illawarra Health and Medical Research Institute, is an exciting initiative. Director of the Institute, Professor Don Iverson, believes the SESIH and UOW will be able to build on its research capacity enabling the Institute to become a national and international leader in its niche research strengths: cancer, ageing, metabolic disorders (heart disease, diabetes, obesity), and anti-infectives (bacterial, viral and protozoal).

**EXAMPLES OF “ILLAWARRA HEALTH & MEDICAL RESEARCH” PROJECTS**

**MENTAL HEALTH CARE TRIAL**

Individuals suffering from severe and enduring psychiatric disabilities also have to battle a sense of their own helplessness. A team of researchers at UOW’s Illawarra Institute for Mental Health (iiMH) is leading the way in a new treatment and training program that could quietly revolutionise mental health care. The model (referred to as the Collaborative Recovery Model) focuses on motivating them to set goals, achieve dreams and lead fulfilling and rewarding lives, despite their psychiatric disability. Dr Lindsay Oades and Professor Frank Deane both from iiMH, and a team of PhD students, will train 250 mental health workers who in turn will treat over 200 patients with mental illness, primarily schizophrenia and bipolar disorder.

“This program places symptoms into context so that sufferers can have an improved quality of life and track their own progress. Medication is only one aspect of treatment”, said Prof Deane.

Since the trial began in June 2003, there have been significant improvements in the trained workers including attitudes towards care and recovery, a sense of hopefulness for patients and a number of achieved outcomes and goals.

**NEUROBIOLOGY OF OBESITY**

It is estimated that about 75 per cent of the Australian population will be overweight or obese by 2020. Excessive energy intake is a primary contributor to the development of obesity in people genetically susceptible. Over the past 10 years, numerous molecules have been found to regulate hunger and thereby regulate eating behaviour but a lack of information regarding how these molecules function has meant that no ideal drugs have yet been produced. UOW’s Neurobiology Research Centre for Schizophrenia and Metabolic Disorders (NRC) is developing animal models that mimic human conditions and can be used to investigate the regulatory mechanisms for energy balance, and for testing obesity drugs.

“Our mouse models can be used for screening drugs and identifying key molecules relevant to obesity. This will lead to better targets for the prevention of diet-induced obesity, more effective treatments for the late stage of obesity, and a better understanding of the individual susceptibility to diet-induced obesity”, says NRC Director Professor Xu-Feng Huang.
The Energy Futures Network is a new initiative that brings together researchers from a broad range of disciplines to maximise the effectiveness of UOW's involvement in the global effort to develop sustainable energy supply systems and to better understand how use of energy impacts upon the environment. The objectives of the Network are to: develop productive links between existing research entities at UOW; capitalise on existing and potential synergies to generate new collaborative research activities/outcomes; develop partnerships with industry and other external groups; and to provide an effective vehicle for promotion of this research at UoW to the wider community. Highlights of the research include development of energy production and transformation technologies (eg new materials for photovoltaic conversion, hydrogen production and superconductors); energy storage systems; renewable energy technologies; distributed resource integration to electrical power systems; atmospheric chemistry and related environmental research.

The vision of the Network is to develop a world class program of research at UOW in Environmentally Sustainable Energy Systems covering Energy Production, Utilisation and Environmental Impacts.

The Energy Futures Network was formally launched by UOW's Deputy Vice-Chancellor in April 2007 as part of Sustainability Week - a new regional initiative designed to raise awareness in the community about issues such as climate change, new energy supply systems and environmentally friendly transport.

### Examples of "Energy Futures Network" Research Projects

#### Ocean Wave Energy Conversion

The Wave Energy Research team is carrying out experimental and theoretical work on the development of Oscillating Water Column (OWC) systems and a close collaboration is ongoing with one of the world's leading Ocean Wave Energy companies, Oceanlinx, which has built a 0.5MW demonstration plant located in the ocean at Wollongong. A recent ARC Linkage Grant in collaboration with Oceanlinx is investigating various research projects which include:

- numerical modelling and Computational Fluid Dynamics (CFD) studies are being used to optimise the design, performance and control of air turbines driven by OWC's;
- optimisation of overall plant efficiency. Experimental scale models are used to make practical measurements;
- fundamental hydrodynamic studies of ocean waves using numerical methods. The aim is to determine the optimal hydrodynamic configuration of the OWC and associated components such as reflector walls, sea-floor topography and presence of breakwalls etc. Artificial Photosynthesis: Organic Solar Cells.

Energy is arguably the single most important problem facing humanity today. The development of cheap, efficient photovoltaic technology could dramatically change this, providing renewable, environmentally acceptable energy resources. The detrimental effects of global warming from increasing carbon dioxide production are clear. There is an urgent need to develop new forms of electrical energy generation which reduce our dependence on fossil fuels.
The Social Innovation Network (SINet) at the UOW was developed in 2007 and is focused on the development of new concepts, strategies and tools that empower individuals, communities, organisations and the government to improve quality of life in terms of health and environment, and social harmony. In short, the network aims to create better futures for people.

Research projects currently being investigated which address the quality of life include:

- the investigation of reasons for poverty in developed countries,
- the development of innovative advertising campaigns for sun protection;
- the study of effects of prison privatisation,
- a comparison of alternative funding models for the provision of community services;
- the study of issues of water management and native vegetation conservation.

The SINet comprises of researchers from a number of groups and centres within the Faculties of Science, Arts, Creative Arts, Health and Behavioural Sciences, Education, Commerce and the Graduate School of Business.

The convenors of the Network, Professor Sara Dolnicar (Commerce) and Professor Jan Wright (Education) are working towards bringing faculty-based research into a wider network, which would enable a greater range of interdisciplinary research and encourage industry partners to be more involved.

EXAMPLES OF “SOCIAL INNOVATION NETWORK” RESEARCH PROJECTS

POVERTY

This research project investigates the extent, causes and consequences of poverty in developed countries. The project has several components: to contribute to the methodology of poverty measurement within a dynamic context, to identify groups within the Australian population among whom chronic poverty is most intense and to identify the events and conditions that cause chronic and transitory poverty. A major objective is to determine the extent to which poverty is perpetuated from one generation to another, the conditions that lead to intergenerational poverty and the events and activities that are likely to break any such cycle of poverty.

SEARCH, NAVIGATION AND ANNOTATION OF DIGITAL MUSEUM COLLECTIONS USING CONCEPT-LATTICES

This project links research expertise and innovation in IT and New Media at UOW with content management and collection access needs of The Australian Museum. Working with the Museum’s Vanuatu Collections and Indigenous communities in Vanuatu as the test case, it explores new ways to access museum-based virtual collections by developing a framework for mapping dynamically collection resources in terms of their annotated attributes. Technically the project links a variety of metadata standards to a concept-lattice based system representing collection resources as a structured associative network. In terms of design and museology it investigates effective means of visualising and interacting with this network. The project outcomes will be of substantial value to cultural institutions involved in archiving, image management, search and discovery and in forging links between objects and intangible cultural heritage for the benefit of various users. The project’s innovative digital content management techniques are also applicable in the public domain.
Throughout the last half of the twentieth century, the art of music has undergone a gradual but radical transformation in the way it is composed, produced, published and disseminated. The transformation has been accelerated as composers increasingly become engaged with using and developing new technologies for music. SARN will pursue a new research agenda where creative practice is the catalyst for innovation both inside and outside the creative arts. Over the next three years the Sonic Arts Research Network (SARN) seeks to identify new reciprocal relationships between creative work and the technologies used to create it. It will build on the track records of composers within the Faculty of Creative Arts, and connect these with related strengths in other creative disciplines within the Faculty and research in the Faculty of Informatics.

**Sonic Arts Research Network major objectives**

- creation, production, publication and dissemination of composition that will extend the boundaries of musical art forms;
- development and application of sound technologies for music through enhanced instrument design, radio and film production, gallery installation, text-sound, new media performance and on-line delivery; and
- collaboration between time-based disciplines in the creative arts and collateral disciplines within informatics and engineering.

**Examples of current projects**

- **Pocket gamelan:** Tuning Musical Applications for Wireless Internet. This project proposes a new mobile electronic instrument prototype suitable for live performance of music. Recent developments in tuning theory will play an important role in the development of the prototype allowing it to become a new live electronic performance medium for music. The prototype will be tested using tuning principles that have evolved in music over many centuries on every continent. A Journey to Horseshoe Bend is composed by the Dean of the Faculty of Creative Arts, Professor Andrew Schultz, and based on an idea of librettist Gordon Kalton Williams, the opera Journey to Horseshoe Bend was premiered at the Sydney Opera House in 2003. The performance was conducted by the internationally acclaimed David Porcelijn and featured actors Aaron Pedersen and John Stanton, and the Ntaria Ladies Choir from Hermannsburg, Northern Territory, making their first Sydney appearance together with bass baritone Rodney Macann, the Philharmonia Motet Choir and the Sydney Symphony.

  **Journey to Horseshoe Bend** is a cantata developed in consultation with the Strehlow Research Centre and Alice Springs Aranda people. It is a musical interpretation of TGH Strehlow’s autobiographical novel of the same name and tells of his journey down the Finke River Valley of Central Australia where the ancient landscapes of the Aranda people and European pastoral holdings co-exist. Professor Schultz has structured the cantata to reflect the nature of the story and the form of the landscape. He has been very specific in his decision to position the orchestra so it is representative of the sound qualities he wants to evoke of the Finke River valley. Professor Schultz has experience working with Aboriginal themes as evidenced by his opera, Black River, which received critical acclaim when premiered in 1989.
The Innovation Campus (iC) is a $350 million research and business community being developed by the University of Wollongong (UOW) as a home for enterprise, partnership and business growth. The iC participants will include some of UOW’s key research teams, industry partners and creative companies.

The University is developing the campus in a joint venture partnership with construction company Baulderstone Hornibrook on a 33-hectare beachside site to the north of Wollongong’s CBD. Construction on the $100 million Stage One is underway, with the research institutes and corporations moving there progressively through 2008 as four new buildings are completed.

Global management consulting and technology services company Accenture is an example of the companies being attracted to UOW by opportunities to locate at iC and tap into UOW’s research strengths and graduate skills. Accenture has established an information technology development and client support facility at UOW, attracted by access to graduates from Australia’s biggest UOW’s Faculty of Informatics, Australia’s largest IT Faculty.

The Innovation Campus, which is expected to eventually provide employment for 5,000 people, is seen as integral to Wollongong’s future growth and is being developed with significant state and federal funding and support from local government. The NSW Government has provided around $26 million in development funding, and is offering various incentives and tax breaks for companies interested in locating there, while the Federal Government has made a strategic contribution.

The first iC building are due to open in mid 2008. They include the campus hub, iC Central, which will provide office and meeting space as well as cafes, retail space, recreation and health facilities, and conference rooms. The Australian Institute for Innovative Materials building will then welcome two of the university’s flagship research teams - the Intelligent Polymer Research Institute and the Institute for Superconducting and Electronic Materials which are components of the Australian Centre for Excellence in Electronic Materials.

The Federal Government has committed $12 million for a third iC building to house UOW’s Centre for Transnational Crime Prevention, Centre for Maritime Policy and Centre for Comparative Law and Development Studies in Asia Pacific. All three centres have strong links with governments and agencies throughout the Asia-Pacific region in training, research and consultancy services. The fourth building will house the University’s Business School and a joint TAFE/UOW Digital Media Centre for graphic design and audio-visual training and development.

IC offers 135,000 sqm of new space with tailored workspaces in flexible, light-filled and energy-efficient buildings. The iC Masterplan allows for a staged development to provide:

- 84,000 square metres for research, training and office space
- 5,000 square metres for retail and service facilities
- a hotel and conference facilities
- 18,000 square metres for residential accommodation
- On-site child-care (first stage already in operation)

Facilities are custom-designed to meet individual needs and provide access to the iC’s advanced technology infrastructure. iC is attracting interest and commitment from a range of companies looking to develop ideas and applications in a place that encourages creative people and partnerships.
THE UOW COMMERCIALISATION MODEL

UOW has a unique commercialisation model, in which UOW has partnered with UniQuest, the technology transfer company of the University of Queensland. This enables UOW to access a large team of commercialisation staff without the costly duplication of expertise. It also allows UOW to leverage the expertise of both universities to package technologies. UniQuest manages an extensive intellectual property portfolio. It has more than 45 active start-up companies, a large patent portfolio and Australia’s most lucrative university licenses, including a licence to CSL Limited which forms the basis of Merck’s cervical cancer vaccine.

As a result of the collaboration, UOW has implemented the UniQuest model of having Managers of Innovation and Commercialisation (MICs) located in faculties. The MICs work closely with UOW researchers, to identify, protect and manage commercialisation of innovations via licensing with appropriate industry partners or through the formation of dedicated spin-out companies. The MICs also assist UOW researchers to engage with industry and establish research and commercialisation partnerships. Since the development of the UOW Uniquest relationship the number of invention disclosures, patent applications, and commercial outcomes has increased dramatically.

In addition, each year, UOW sends up to 20 staff and 20 students to an intensive commercialisation training workshop held in Queensland and run by UniQuest.
Profiling our research partners

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